

What is claimed is:

1. A paint ball gun having a body carrying a barrel from which a paint ball is pneumatically discharged; and a grip frame providing a grip, a trigger, and a trigger guard; said trigger including a pair of oppositely extending trigger wings, said trigger and grip frame cooperatively defining a trigger pivot disposed intermediate of said pair of trigger wings, the 5 trigger having a neutral position intermediate of a pair of firing positions, each firing position being disposed in a respective opposite rocking direction from said neutral position, and means associated with said trigger for effecting a firing action of said gun to discharge a paint ball in response to rocking of said trigger to either one of said pair of firing positions.

2. A paint ball gun having a body, a barrel for pneumatically discharging a paint ball, and a grip frame providing a trigger and trigger guard; an electrical circuit cooperating with a solenoid valve to effect a pneumatic firing action of the gun in response to a trigger movement, and a pair of switches operating in alternation with one another to each provide an input to said 5 electrical circuit thus to effect a firing action of the gun in response to actuation of either one of said pair of switches.

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3. An electro-pneumatically operated paint ball gun, said paint ball gun having a main body defining a first bore for receiving a paint ball, said first bore also receiving a reciprocable bolt assembly which in respective first and second positions relative to said main body closes and opens a breech of said gun, a feed inlet opening to the first bore for providing a supply of
5 paint balls to said breech, said main body further defining a second bore spaced below and substantially parallel with said first bore, and a passage for communicating pressurized gas from said second bore to said breech;

a pneumatic discharge valve disposed in said second bore, said pneumatic discharge valve including a seat member, and a poppet valve member sealingly engaging in a first position
10 upon said seat member to close communication of pressurized gas from a source thereof to said breech via said passage, said poppet valve member including a poppet valve stem extending through said seat member rearwardly of said gun;

a pneumatic hammer assembly also disposed in said second bore aft of said discharge valve, said pneumatic hammer assembly including a sleeve member defining a bore, a hammer member reciprocally and sealingly movable in said sleeve member bore and cooperating therewith to define a variable volume chamber having a minimum volume with said hammer member in a first position, a spring disposed in said second bore between said pneumatic hammer assembly and said pneumatic discharge valve and biasing said hammer member to said first position, said hammer member in response to receipt of pressurized gas in said sleeve bore being
15 movable axially forwardly of said gun to a second position to abut said poppet valve stem, thus unseating said poppet valve member to a second position and opening said discharge valve to communicate pressurized gas to said breech via said passage;

a trigger member having a pair of oppositely extending trigger wings, and a pivot disposed intermediate of said pair of trigger wings, said trigger having a neutral position
25 disposed intermediate of a pair of firing positions each pivotally disposed on opposite sides of said neutral position, and said trigger being effective to initiate a firing event of said gun in response to pivoting of said trigger in either direction from said neutral position to one of said pair of firing positions;

a pneumatic ram having a piston and a rod connecting with said bolt assembly for
30 moving said bolt assembly between said first and second positions in response to respective pneumatic pressures applied to said piston; a pair of solenoid valves each receiving pressurized

gas from a source thereof; and one of said pair of solenoid valves communicating pressurized gas selectively to said ram to apply said first and second pneumatic pressures thereto, thus controllably effecting opening and closing of the breech of said paint ball gun by said bolt assembly; a second of said pair of solenoid valves communicating pressurized gas selectively to said pneumatic hammer assembly to controllably effect movement of said hammer member between its first and second positions;

further including a programmable controller selectively controlling said first and second solenoid valves in response to pivoting movement of said trigger to one or the other of said pair 40 of firing positions.

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5. A retrofit kit assembly for use in converting a conventional "autococker" type of paintball gun having a main gun body into an electro-pneumatically operated paintball gun providing an extraordinarily high cyclic rate of fire of paintballs from said gun, said retrofit kit of parts including:

5 a grip frame for attachment to said main gun body, said grip frame carrying a trigger and including a trigger guard;

10 said trigger having a pair of oppositely extending trigger wings, and a pivot upon said grip frame disposed intermediate of said pair of trigger wings, said trigger having a neutral position disposed intermediate of a pair of firing positions each pivotally disposed on opposite sides of said neutral position, and said trigger being effective to initiate a firing event of said gun in response to pivoting of said trigger in either direction from said neutral position to one of said pair of firing positions;

15 said grip frame also having an internal electronics and valving assembly;

20 said electronics and valving assembly including a circuit board carrying a microprocessor-based control system and a pair of trigger switches cooperable with said trigger to provide an input to said control system in response to a trigger movement of said trigger to either one of said pair of firing positions;

25 said electronics and valving assembly also including a 3-way solenoid valve;

30 a pneumatic hammer assembly receiving a pneumatic signal from said 3-way valve, said pneumatic hammer assembly including a sleeve member defining a bore, a hammer member reciprocally and sealingly movable in said sleeve member bore and cooperating therewith to define a variable-volume chamber having a minimum volume with said hammer member in a first position, said hammer member being movable in response to receipt of said pneumatic signal from said 3-way valve to extend outwardly of said sleeve member to a second position in which said hammer member is cooperable with a discharge valve of said gun to open said discharge valve, and a spring for biasing said hammer member to said first position;

35 a ram operably coupled with a bolt assembly of said gun;

40 and a 4-way solenoid valve providing opposite pneumatic signals to said ram for reciprocating said bolt assembly between closed and opened positions.

6. The retrofit kit assembly of Claim 5 wherein said programmable controller includes a microprocessor, and said microprocessor is utilized to effect a first programmable time interval between an event starting movement of said hammer member from its first position toward its second position, and a next subsequent event starting movement of said hammer member from its second position back toward its first position.

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7. The retrofit kit assembly of Claim 6 wherein said programmable controller is utilized to effect a controlled variable time interval between said first event and said second event.